

Title (en)  
INTEGRATING A CRYOSTAT THAT HOSTS QUBITS WITH ELECTRONICS FOR CONTROLLING THE QUBITS

Title (de)  
INTEGRATION EINES KRYOSTATS, DAS QUBITS MIT ELEKTRONIK ZUR STEUERUNG DER QUBITS BEHERBERGT

Title (fr)  
INTÉGRATION D'UN CRYOSTAT HÉBERGEANT DES BITS QUANTIQUES À UN SYSTÈME ÉLECTRONIQUE DE COMMANDE DES BITS QUANTIQUES

Publication  
**EP 3915062 A4 20220406 (EN)**

Application  
**EP 20746081 A 20200127**

Priority  
• US 201962797162 P 20190125  
• US 2020015273 W 20200127

Abstract (en)  
[origin: WO2020154745A1] A quantum computing system includes a cryostat to support a low-temperature vacuum environment during operation of the quantum computing system; a quantum processor positioned in the cryostat; a first electronic control module external to the cryostat; a second electronic control module within the cryostat; at least one optical transmission line connecting the first electronic control module external to the cryostat with the second electronic control module internal to the cryostat, the optical transmission line being configured to transmit optical signals to and from the second electronic control module during operation of the quantum computing system; and a plurality of signal lines connecting the second electronic control module with the quantum processor, a first subset of the signal lines being configured to transmit microwave signals to and from the quantum processor during operation of the quantum computing system.

IPC 8 full level  
**G06N 10/40** (2022.01)

CPC (source: EP US)  
**G06F 1/20** (2013.01 - US); **G06N 10/00** (2018.12 - US); **G06N 10/40** (2022.01 - EP)

Citation (search report)  
• [A] US 10043136 B1 20180807 - ABDO BALEEGH [US]  
• [A] US 2012201268 A1 20120809 - BOYD STEPHEN THOMAS [US], et al  
• [XYI] DENG HUI: "An Ultrafast Electrical and Optical Excitation System for Research on Polaritons in Hybrid Cavities for Scalable Quantum Photonics", 8 August 2018 (2018-08-08), Arlington, Virginia, XP055896232, Retrieved from the Internet <URL:https://apps.dtic.mil/sti/pdfs/AD1057723.pdf> [retrieved on 20220228]  
• [YA] IAN CONWAY LAMB: "Cryogenic Control Beyond 100 Qubits", MASTER OF SCIENCE IN PHYSICS THESIS, SCHOOL OF PHYSICS, 31 December 2016 (2016-12-31), Australia, pages 1 - 103, XP055665094, Retrieved from the Internet <URL:https://ses.library.usyd.edu.au/handle/2123/17046 // https://pdfs.semanticscholar.org/8df1/1b1eade027a6541498eb61d2e1b2e75e5c7f.pdf?\_ga=2.129242060.1197649659.1580826411-360960905.1580726694> [retrieved on 20200204]  
• [A] FABIO SEBASTIANO ET AL: "Cryo-CMOS Electronic Control for Scalable Quantum Computing", 20170618; 1077952576 - 1077952576, 18 June 2017 (2017-06-18), pages 1 - 6, XP058367761, ISBN: 978-1-4503-4927-7, DOI: 10.1145/3061639.3072948  
• See references of WO 2020154745A1

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

DOCDB simple family (publication)  
**WO 2020154745 A1 20200730**; EP 3915062 A1 20211201; EP 3915062 A4 20220406; US 2021350270 A1 20211111

DOCDB simple family (application)  
**US 2020015273 W 20200127**; EP 20746081 A 20200127; US 202117384595 A 20210723